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APPLICATION NUMBER: 60/531,747

FILING DATE: *December 22, 2003*

RELATED PCT APPLICATION NUMBER: *PCT/US04/43375*



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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Express Mail Label No. EV395988801US

INVENTOR(S)					
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)			
Mark Alan Matthew Robert	Schultz Lamb	Carmel, Indiana Westfield, Indiana			
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
BIASED LENS MOUNTING FOR SEGMENTED DISPLAYS					
CORRESPONDENCE ADDRESS					
Direct all correspondence to:					
<input type="checkbox"/> Customer Number		<input type="text"/>		Place Customer Number Bar Code Label here	
OR					
<input checked="" type="checkbox"/> Firm or Individual Name		JOSEPH S. TRIPOLI, THOMSON LICENSING INC.			
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages		5	<input type="checkbox"/> CD(s), Number		<input type="text"/>
<input checked="" type="checkbox"/> Drawing(s) Number of Sheets		Inclusive	<input type="checkbox"/> Other (specify)		<input type="text"/>
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.					
<input type="checkbox"/> A check or money order is enclosed to cover the filing fees					
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 07-0832					
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.					
FILING FEE AMOUNT (\$) 160					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
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Respectfully submitted,

SIGNATURE

Patricia A. Verlangieri

Date

12/22/03

REGISTRATION NO.

42,201

(if appropriate)

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PU030326

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USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

16018 U.S. PTO
60/531747



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1. Descriptive Invention Title: Biased Lens Mounting for Segmented Displays

2. Inventor (s) Information (The first named inventor should be the primary contact for Patent Operations)

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<u>First Name</u>	Matthew	<u>Middle Name</u>	Robert	<u>Last Name</u>	Lamb

Brief summary of the invention:

This invention provides a method to minimize distortion on segmented displays by varying the lens mounting on selected projectors to increase the quality of alignment in the more critical areas of the screen. Instead of every projector having the same lens mounting, each projector will have a lens mounting target based on where the projector is used in the segmented display.

Background

Distortion of all types create problems in aligning segmented displays. As the segments increase, the tradeoffs between seams get more difficult. This approach gives a method to help control the distortion on each lens to give an improvement in the overall picture. This shows a solution for the vertical direction while a similar solution is possible in two-dimensional arrays with both X and Y axis considerations.

When all of the projected images from segmented displays are perfect, the alignment is easy each segment. When lens, mirror, and screen distortions occur, the alignment becomes very complicated and tradeoffs must be made in the overall system response. Having the same lens and picture distortions on every projector may not deliver the best overall picture quality. Our approach is to use different types of distortion to our advantage.

Description of the Invention

Each projector has a lens, a mirror, and a portion of the screen that the image is projected on. We find that if we start on one edge in aligning projectors, by the time we get to the opposite edge of the screen, the distortion is so great that we can no longer obtain a satisfactory alignment. Our demo is using a 4:1 matrix, which contains three seams. Each projector has the same lens and the same mirror structure but the distortion varies from projector to projector.

This invention proposes to align individual projectors differently depending on where they are located in the array. Individual projection distortions are biased toward a desired pattern to decrease the distortion found within the seam area where the distortion is most noticeable by increasing the distortion in on the outer edges where the distortion is less noticeable. The details can be explained in the figures.

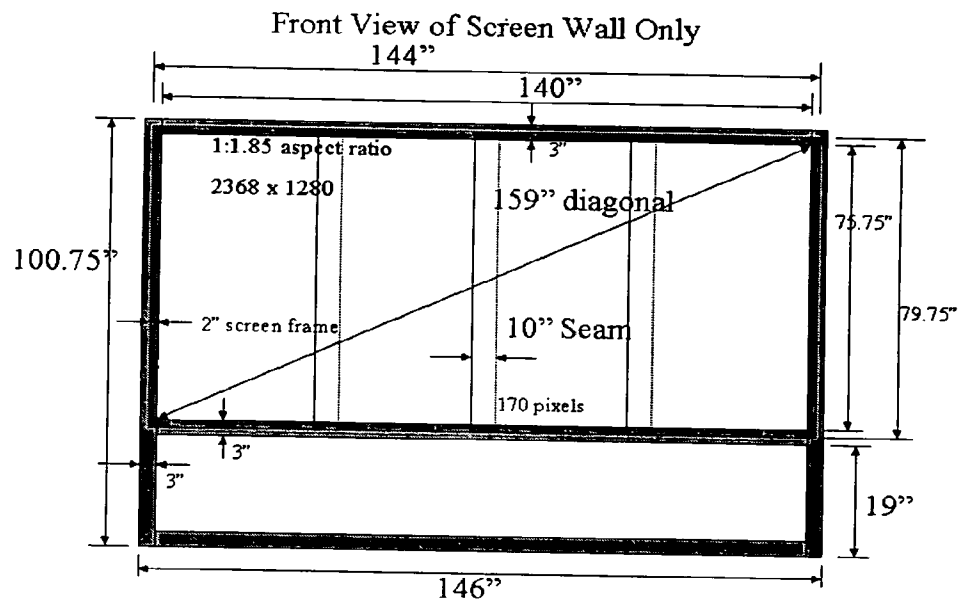


Figure 1

Figures 1 – 3 show the segmented display setup made up of four vertically mounted 16:9 displays.

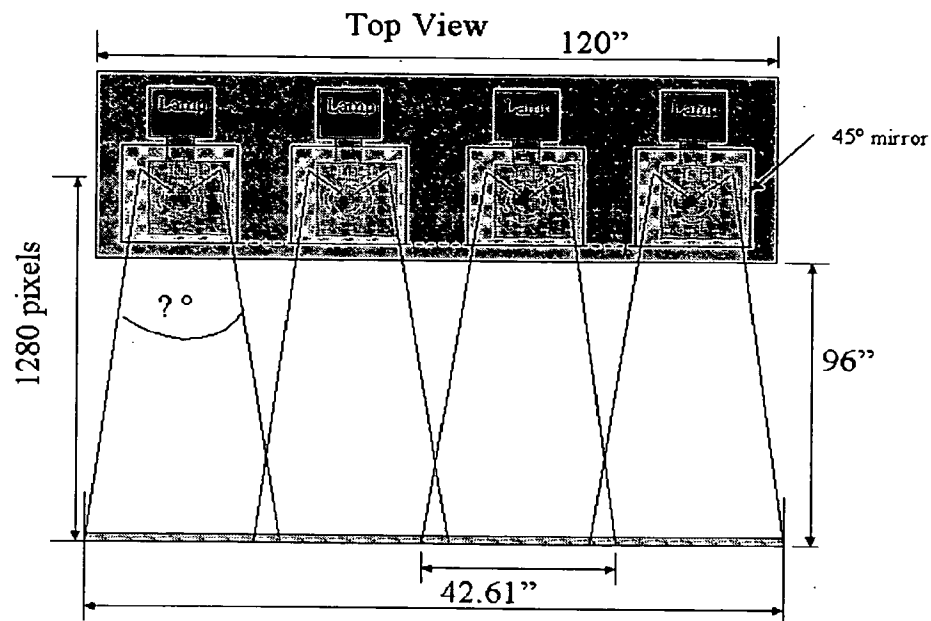


Figure 2

Side View

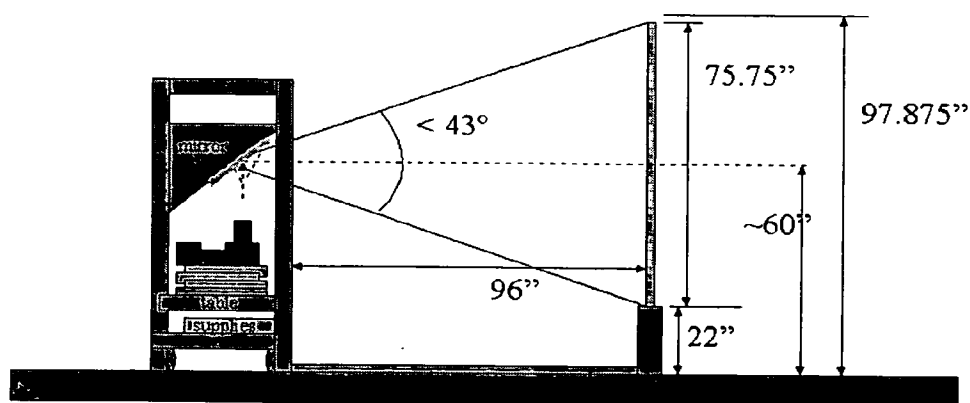
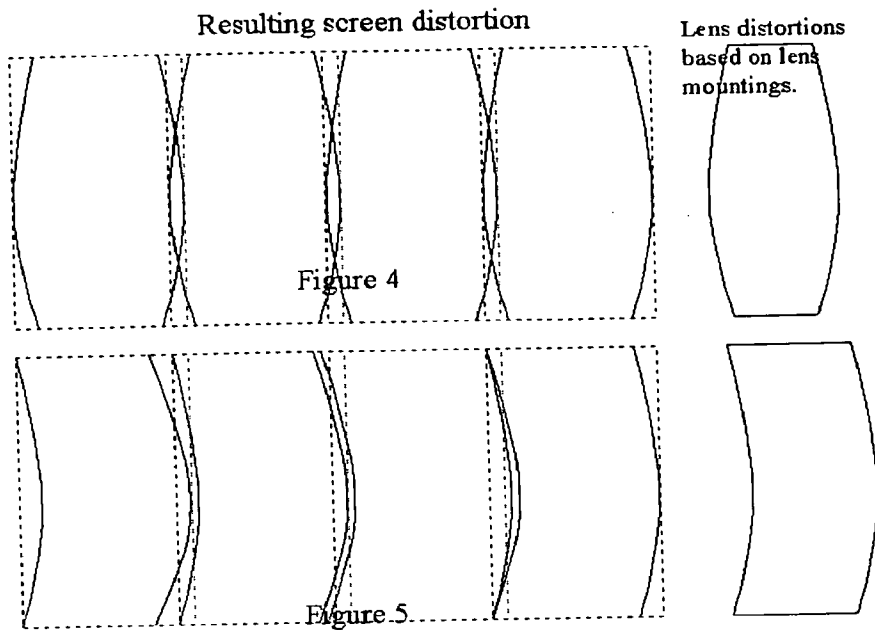
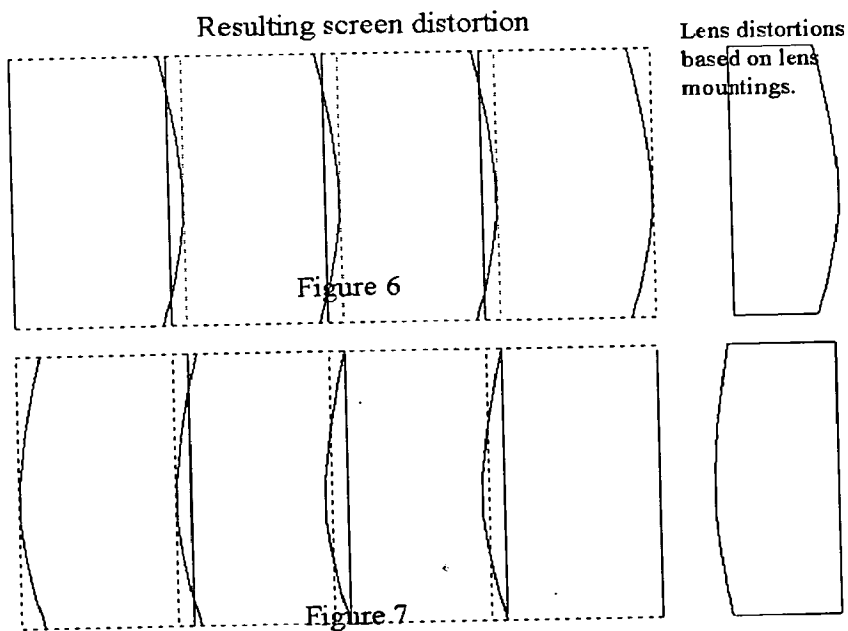


Figure 3



Figures 4-7 show typical distortions found on a single projector and the problems when trying to seam four projectors. The vertical and horizontal lines at the top become a problem in the seams. Some of this can be improved by using much more expensive optics but we hope our proposal delivers acceptable results using the lower cost lenses.



Some of these distortions are exaggerated to show the problems but all of them demonstrate the alignment issues found after all keystone problems have been corrected.

Our proposal is to align the projector on the left so that the right edge is as straight as possible where it is critical in the seam area as shown in Figure 6 and live with the left edge distortion since it is not very noticeable.

The two center projectors should be aligned to deliver a symmetrical distortion on each edge like Figure 4 since any alignment compromises to improve one side becomes a degradation on the other edge.

The projector on the right should be aligned to deliver a straight edge on the left side where it is critical in the seam area and live with the edge distortion on the right side where it is not very noticeable.

The result shown in Figure 8 is that the middle seam is unchanged but the two side seams have about 50% of the original alignment distortion. The left and right edges will be worse but normally no one will even notice distortion on the edges.

